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NATIONAL RECOVERY ADMINISTRATION
DIVISION OF REVIEW

E V I D E N C E S T U D Y

NO. 17

OF

THE GRAY IRON FOUNDRY INDUSTRY

Prepared by

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PRELIMINARY DRAFT
(NOT FOR RELEASE: FOR USE IN DIVISION ONLY)

THE EVIDENCE STUDY SERIES

The EVIDENCE STUDIES were originally planned as a means of gathering evidence bearing upon various legal issues which arose under the National Industrial Recovery Act.

These studies have value quite aside from the use for which they were originally intended. Accordingly, they are now made available for confidential use within the Division of Review, and for inclusion in Code Histories.

The full list of the Evidence Studies is as follows:

1. Automobile Manufacturing Ind.
2. Boot and Shoe Mfg. Ind.
3. Bottled Soft Drink Ind.
4. Builders' Supplies Ind.
5. Chemical Mfg. Ind.
6. Cigar Mfg. Industry
7. Construction Industry
8. Cotton Garment Industry
9. Dress Mfg. Ind.
10. Electrical Contracting Ind.
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12. Fab. Metal Prod. Mfg., etc.
13. Fishery Industry
14. Furniture Mfg. Ind.
15. General Contractors Ind.
16. Graphic Arts Ind.
17. Gray Iron Foundry Ind.
18. Hosiery Ind.
19. Infant's & Children's Wear Ind.
20. Iron and Steel Ind.
21. Leather
22. Lumber & Timber Prod. Ind.
23. Mason Contractors Industry
24. Men's Clothing Industry
25. Motion Picture Industry
26. Motor Bus Mfg. Industry (Dropped)
27. Needlework Ind. of Puerto Rico
28. Painting & Paperhanging & Decorating
29. Photo Engraving Industry
30. Plumbing Contracting Industry
31. Retail Food (See No. 42)
32. Retail Lumber Industry
33. Retail Solid Fuel (Dropped)
34. Retail Trade Industry
35. Rubber Mfg. Ind.
36. Rubber Tire Mfg. Ind.
37. Silk Textile Ind.
38. Structural Clay Products Ind.
39. Throwing Industry
40. Trucking Industry
41. Waste Materials Ind.
42. Wholesale & Retail Food Ind. (See No. 31)
43. Wholesale Fresh Fruit & Veg.

In addition to the studies brought to completion, certain materials have been assembled for other industries. These MATERIALS are included in the series and are also made available for confidential use within the Division of Review and for inclusion in Code Histories, as follows:

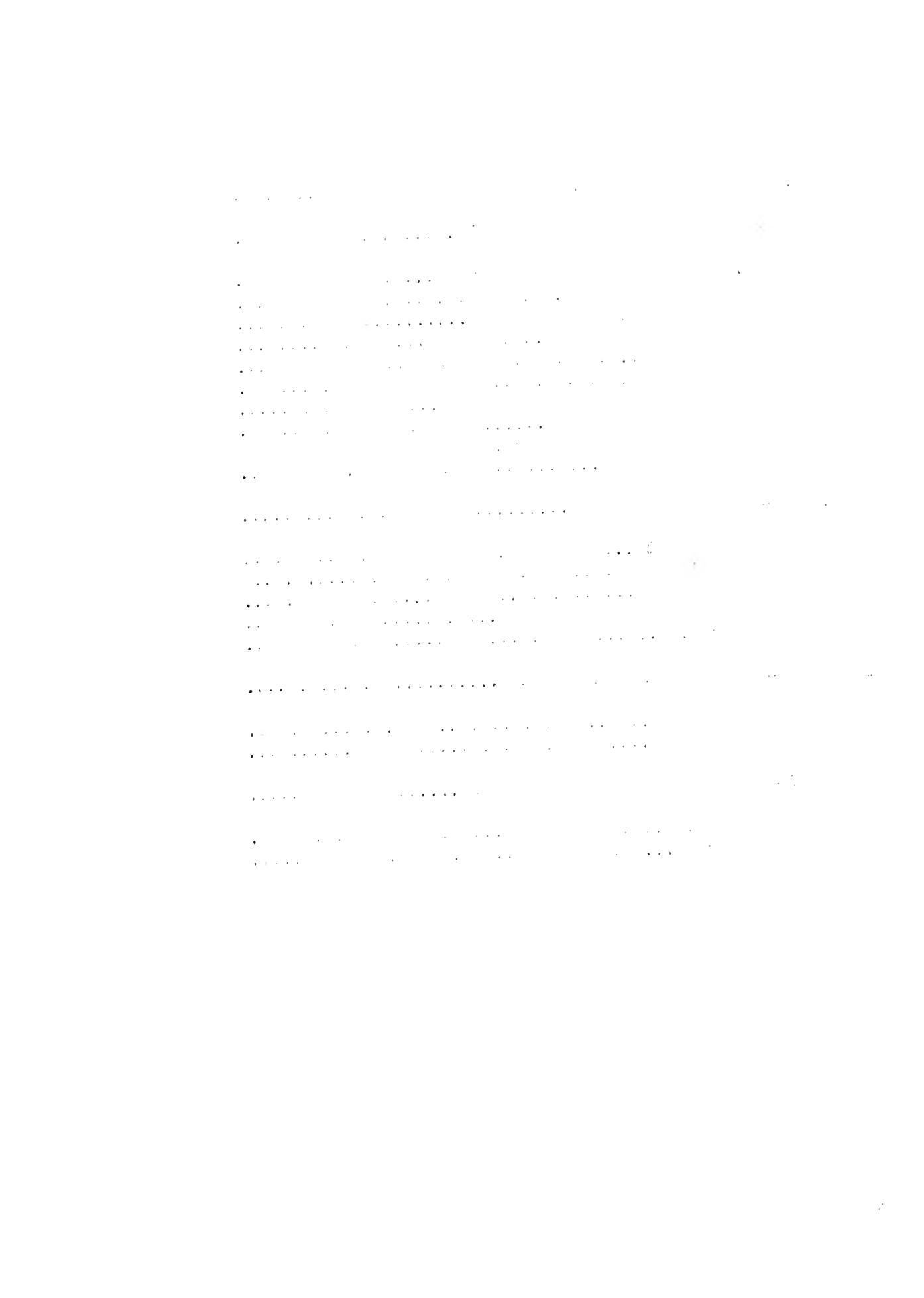
44. Wool Textile Industry
45. Automotive Parts & Equip. Ind.
46. Baking Industry
47. Canning Industry
48. Coat and Suit Ind.
49. Household Goods & Storage, etc. (Drop-
ped)
50. Motor Vehicle Retailing Trade Ind. (Drop-
ped)
51. Retail Tire & Battery Trade Ind.
52. Ship & Boat Bldg. & Repairing Ind.
53. Wholesaling or Distributing Trade

L. C. Marshall
Director, Division of Review

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THE GRAY IRON FOUNDRY INDUSTRY

Foreword

Comprehensive data on the Gray Iron Foundry Industry are lacking from government or private sources. With the exception of certain production data taken from Census Bureau reports, and monthly labor data for 1933 and 1934 collected by the Bureau of Labor Statistics, the statistics in this report are compiled from scattered sample studies made during the past decade. Unless otherwise specified, these samples include only foundries covered by the Code, that is, foundries producing gray iron castings for sale.

The lack of Code Authority material is explained by the following letter to the NRA from the late Code Authority.

"You will recall that some of the information that you requested in regard to the Gray Iron Foundry Industry had to be procured inasmuch as it was not available in the Code Authority statistical records. Unfortunately this information was not sent in, because the members of whom it was requested felt that the Supreme Court decision made it unnecessary for them to furnish the information.

"In addition to the above obstacle, the other statistics that you requested us to compile were sent by the members of the Industry to the Code Authority. The Code Authority is now taking steps to return this information to each and every member of the Industry; as a result, it does not seem proper for us now to make any use of these statistics other than to see that the reports are returned to those furnishing the statistics."

The scarcity of appropriate data accounts for the omission of the sections dealing with Trade Practices (Chapter V) and General Information (Chapter VI).

Chapter I

THE NATURE OF THE INDUSIRY

Definition of the Industry

The Gray Iron Foundry Industry as defined in the Code, which was approved February 10, 1954, means and includes

"the business of producing and selling in the open market ferrous or ferrous base castings other than steel or malleable iron castings, whether cast in sand or other type of mould, and commonly known as grey iron castings and sold in competition with similar gray iron castings either with or without any subsequent processing thereon performed by the producer; provided, however, that such term shall not include said castings when produced by a manufacturer in another Industry (including any affiliated or parent company of such manufacturer) (1) as part of his own products in such other Industry (including finished and semi-finished parts therefor) or (2) as materials for servicing products of such other Industry (including finished and semi-finished parts therefor) when such servicing materials are distributed by such manufacturer to the user of products of such other Industry either directly or through such manufacturer's usual distribution channels."

Number of Plants

While substantiating data are not readily available as to the number of plants in the Industry, a verbal remark of the former Executive Vice-President of the Industry's Code Authority, Mr. H. W. Halsted, Jr., indicated that there are today approximately 1,850 plants coming within the scope of the Industry as defined in the Gray Iron Foundry Code.

Geographical Distribution

The geographical distribution, by districts, of 1,437 of these plants, is presented in Table I.

According to this table, foundries producing gray iron castings for sale are not confined to a specific area, but are located in all states. Based both on tonnage and the number of reporting plants, the concentration of the Industry appears greatest in the districts adjacent to the Great Lakes and in the New England States.

Capital Investment

Although complete data on the amount of capital invested are not available, the Gray Iron Institute estimated that capital investment

for the year 1933 amounted to approximately \$243,500,000.

Failures

According to Dun and Bradstreet's report on insolvencies for 1934, only one failure occurred in the Industry during that year.

TABLE I
Number and Tonnage of Plants, by Districts, 1933

District and District Number	Number of Plants Reporting	Tonnage
Total, All Districts	1,437	783,345
1-A - Washington, Oregon, Idaho, Montana	74	9,634
1-B - California, Utah, Arizona, Nevada	76	28,861
2 - Minnesota, North Dakota, South Dakota, Wyoming, Wisconsin	119	44,042
3 - Colorado, New Mexico, Kansas, Missouri, Southern Illinois	81	38,590
4 - Iowa, Northern Illinois, Northern Indiana, Nebraska	119	120,026
5 - Michigan	91	109,866
6 - Northern Ohio	94	78,261
7 - Southern Indiana, Southern Ohio, Kentucky	124	65,181
8 - Western Pennsylvania, West Virginia, Garrett and Allegheny Counties in Maryland	89	31,385
9 - Eastern Pennsylvania, Southern New Jersey, Delaware, D. C., Maryland, except Garrett and Allegheny Counties	84	45,618
10 - Western New York, Erie County in Pennsylvania	52	32,273
11 - Massachusetts, Rhode Island, Maine, New Hampshire, Vermont	117	44,039
12 - Connecticut, Eastern New York	56	34,077
13 - Northern New Jersey, Northeastern Pennsylvania	48	50,010
14 - Texas, Oklahoma, Arkansas, Louisiana	89	15,302
15 - Mississippi, Alabama, Tennessee, Georgia, Florida, North Carolina, South Carolina, Virginia	124	36,154

Source: Gray Iron Foundry Industry Code Authority.

Production

The value and volume of gray iron castings produced for sale, as reported by the Bureau of the Census, and presented in Table II, indicate a decline of 72 per cent in value and 67 per cent in volume from 1929 to 1933.

TABLE II
Production of Gray Iron Castings a/

Year	Tonnage (thousands)	Value (millions)
1929	5,080	\$375.5
1931	2,390	174.2
1933	1,653	107.0

Source: Census of Manufactures, as reported in "Foundry and Machine Shop Products." Establishments whose annual production is less than \$5,000 are excluded.

a/ Data reported by the Census are for manufacturers' sales.

New and unfilled orders, production, and receipts and stocks of materials are shown in Table III, from 1929 through July, 1933, when the reports were discontinued. From this table it can be seen that the Gray Iron Foundry Industry shared in the boom of 1933, nearly reaching the production level of 1930.

TABLE III

Orders, Production, and Materials in the Gray Iron
Foundry Industry, 1929-July, 1933
(monthly average, tons per foundry)

Year and Month	Orders		Produc- tion	Materials	
	New	Unfilled End of Month		Receipts	Stocks
1929	222	203	262	281	360
1930	133	96	152	166	294
1931	92	70	103	120	246
1932	62	51	69	86	212
1933					
January	61	49	62	67	210
February	64	49	69	90	236
March	59	47	65	86	246
April	75	51	68	103	236
May	108	65	99	145	254
June	143	83	122	169	363
July	162	103	141	206	359

Source: Reports of the Gray Iron Institute, Incorporated, to the Bureau of Foreign and Domestic Commerce.

Utilized Productive Capacity

The capacity figures in Table IV indicate a wide variation in size of plant and per cent of utilization. Average plant capacity ranges from 665 tons in the Midwest to only 65 tons in the Pacific Northwest. Utilization varies from 63 per cent in the Central Northwest to 29 per cent in the Pacific Northwest.

Although the per cent of utilized productive capacity in certain districts is greater than in others, it is impossible to draw accurate conclusions about the relative efficiency of the various plants located in these districts. Allowance must be made for many factors, the most important being the variation in the nature of the product turned out by the individual plant.

TABLE IV

Per Cent of Productive Capacity Utilized
July 1925 - June 1927

Districts	Monthly Average Per Plant		Per Cent Capacity Utilized
	Capacity a/ (Short Tons)	Production (Short Tons)	
U. S. Average	498	215	43
New England	360	175	50
Central Atlantic	350	165	48
Midwestern	665	270	42
Southeastern	110	45	32
Central Northwestern	360	225	63
Western Mid-Continent	355	120	30
Gulf Southwestern	260	90	35
Pacific Northwestern	65	30	29
Pacific Southwestern	250	95	42
Unidentified	510	245	45

Source: Bureau of Foreign and Domestic Commerce, "Survey of Gray Iron Foundries" (1929). Data for Class 2 (production for sale) plants in Figures 7, 8, and 19 of this survey.

Note: Except for the U. S. average, all figures are numerical interpretations of bar charts. The production and capacity data are not based on identical plants, the number varying from 148 to 152 and hence do not agree exactly with the utilization of capacity percentages.

a/ Maximum, or 100 per cent capacity.

Competing Products

The chief products which compete with gray iron castings are malleable iron castings, steel castings, non-ferrous castings, forgings, stampings, pressed steel products, and welded steel products.

Production of Individual Types of Castings

As indicated by Table V, the industries consuming gray iron castings are numerous. This table, based on a survey covering 142 to 156 gray iron "jobbing" foundries of the 4,009 on Fenton's Foundry List in 1927, shows the distribution by districts of plants producing individual types of gray iron castings for sale. Tonnage figures for the individual types are not available. According to this survey, an average of 6.1 different types of castings were made in the foundries producing for sale.

TABLE V

Distribution by Geographical Districts, of
Foundries manufacturing Specific Types of
Gray Iron Castings for Sale, 1925-1927

Type of Casting	Districts											Total United States
	New England	Central Atlantic	Midwest	Southeast	Central Northwest	West Mid-continent	Gulf Southwest	Pacific Northwest	Pacific Southwest	Unidentified		
<u>Light</u>												
Agricultural	2	1	18	-	1	1	1	1	1	1	1	25
Automotive	3	5	29	-	1	1	1	1	1	1	1	41
Boiler	2	2	8	18	1	4	1	-	2	1	1	36
Builders' hardware	2	2	13	-	1	1	1	1	1	1	1	20
Electrical appliance	4	2	16	-	2	1	1	1	1	1	1	25
Electrical motor	2	4	16	-	1	1	1	1	1	1	1	24
Furniture (including school, church, audi- torium, and barber-chair castings)	1	1	10	-	-	-	-	-	-	-	-	12
Hot-water Heater	-	4	13	-	1	1	-	1	1	1	1	18
Light machinery	9	21	45	2	2	2	2	3	1	1	-	87
Meter (gas, electric, water)	2	1	8	-	1	1	1	1	1	1	1	12
Ornamental	3	6	13	1	1	1	2	2	1	1	-	30
Plumbing and steam fitting	2	3	7	-	1	1	-	-	-	-	-	14
Pump:												
(a) Gas and oil	2	-	11	-	1	1	1	1	1	1	1	14
(b) Steam and water	3	5	7	-	2	1	1	1	1	1	1	17
Radiator	1	1	4	-	1	1	1	1	1	1	1	7
Refrigerator	2	1	12	-	1	1	1	1	1	1	1	18

(Cont'd)

TABLE V (Cont'd)

Type of Casting	Districts										Total United States
	New England	Central Atlantic	Midwest	Southeast	Central Northwest	West Mid-continent	Gulf Southwest	Pacific Northwest	Pacific Southwest	Unidentified	
<u>Light (Cont'd)</u>											
Sanitary	1	4	5	1	2	1	1	1	1	1	12
Scales (cash register, adding machine, typewriter, vending machine)	2	2	9	1	1	1	1	1	1	1	13
Stove plate	1	4	16	1	1	1	1	1	1	1	21
Street equipment (lamps, posts, manhole covers, curbs, sewer openings, markers, etc.)	3	10	27	1	4	2	2	2	1	1	52
Toy	2	1	6	-	1	1	1	1	1	1	9
Warm-air furnace	1	2	10	1	2	1	1	1	1	1	17
Washing and ironing machine	1	7	14	1	1	-	1	1	1	1	26
Miscellaneous light	7	24	43	5	4	2	1	3	2	1	92

TABLE V (Cont'd)

Type of Casting	Districts										Total United States
	New England	Central Atlantic	Midwest	Southeast	Central Northwest	West Mid-continent	Gulf Southwest	Pacific Northwest	Pacific Southwest	Unidentified	
<u>Heavy</u>											
Car Wheels	1	1									4
Engines (gas, steam, oil)	3	13									29
Electrical machinery	2	9									15
Heat-treating equipment (furnaces, pots, etc.)	1	7	6								16
Heavy stamping presses	3	7									12
Machine tools	6	24									37
Material-handling machinery	5	9									20
Mining machinery	3	4									12
Paper-mill machinery	2	9									13
Plate-glass machinery	2	1									2
Road-making machinery	4	4									12
Printing machinery	3	11									14
Soil Pipe	2	1									4
Sugar-mill machinery	3	3									9
Textile machinery	3	4	1								11
Miscellaneous heavy	7	3	1								14

Source: Bureau of Foreign and Domestic Commerce, "Survey of Gray Iron Foundries," (1929). Class 2 foundries, p. 52.

Note: The total number of foundries covered by this survey ranges from 142 to 156, but duplication resulting from the fact that foundries produce castings for more than one industry raises the apparent total to 366.

Chapter II
LABOR STATISTICS

Employment

Reliable figures showing the total number of workers employed in the Gray Iron Foundry Industry are not available. However, figures on total employment contained in the Letter of Transmittal to the President and published in the Industry's approved Code indicate that employment decreased from 99,500 in 1929 to 46,200 during the first quarter of 1933.

Employment in 1934 was about 23 per cent greater than the 1933 average, according to data compiled by the Bureau of Labor Statistics for NRA. (See Table VII)

Annual Wages

The total wage bill for gray iron foundries is not available, but sample data on annual wages have been obtained by the Bureau of the Census. Data for 30 Southern and 30 Northern foundries producing for sale, are summarized in Table VI.

TABLE VI

Employment and Annual Wages in North and South, 1929 - 1931

Item	North		South	
	1929	1931	1929	1931
Number of Plants	30	30	30	30
Number of Wage Earners	2,752	1,815	1,679	1,241
Average Annual Wages	\$1,469	\$1,145	\$1,027	\$ 820

Source: Bureau of the Census, Special Tabulation for the Gray Iron Institute, Incorporated.

TABLE VII

Factory Employment, Payrolls, Hours and Wages, 1933 - 1934/

Month/	Indexes, 1933 = 100 Employment/ Payrolls/ Man-Hours/	Average Hours Worked		Wages	
		Per Week/	(Cents)	Average Hourly/ (Cents)	Average Weekly/ (Dollars)
1933					
Jan.	36.6	76.9	74.5	50.1	14.07
Feb.	87.1	72.2	76.6	47.0	13.14
Mar.	79.6	60.8	60.2	49.0	12.05
Apr.	84.2	68.3	71.4	47.0	12.73
May	85.6	78.5	83.6	46.8	14.53
June	96.3	100.6	112.2	45.5	16.39
July	105.9	114.4	124.3	44.4	16.81
Aug.	115.2	124.6	122.3	49.7	17.03
Sept.	117.8	130.0	123.3	52.3	17.33
Oct.	120.1	135.1	126.4	52.6	17.66
Nov.	111.9	120.9	114.2	52.3	16.80
Dec.	103.9	117.7	111.3	52.3	16.66
Average	100.0	100.0	100.0	49.1	15.43
1934					
Jan.	110.2	117.7	111.4	52.3	16.65
Feb.	117.4	135.1	127.3	52.4	17.99
Mar.	124.4	148.3	140.1	52.4	18.66
Apr.	129.9	158.8	147.2	53.5	19.12
May	128.6	152.9	140.2	54.3	18.61
June	127.4	149.2	134.6	55.2	18.34
July	125.0	137.8	125.9	54.2	17.21
Aug.	122.8	136.0	122.5	55.4	17.46
Sept.	120.3	131.7	113.5	56.0	17.36
Oct.	120.9	139.7	125.3	56.5	13.27
Nov.	120.4	137.2	124.4	55.9	13.09
Dec.	126.5	150.9	136.4	56.1	18.86
Average	122.8	141.3	129.5	54.5	18.05

(Footnotes on
following page)

TABLE VII (Cont'd)

source: Unpublished data secured by the Bureau of Labor Statistics in cooperation with the Division of Research and Planning, NRA.

a/ Reporting establishments considered to be almost completely covered by the Gray Iron Foundry Code.

b/ Figures reported were for the payroll period nearest the 15th of the month.

c/ Based upon a representative sample covering an average of 183 establishments and nearly 10,000 employees in 1933. The sample was much larger in 1934 than in 1933.

d/ Computed: Index of employment times average hours worked per week reduced to 1933 = 100.

e/ Based upon a representative sample covering 123 establishments and nearly 6,000 employees in 1933. The sample was considerably larger in 1934.

Labor Cost

Wages in the North were 45 per cent of the value of product, and in the South 33 per cent, in 1931, according to the aforementioned Census survey. It must be remembered, however, that differences in the nature of the product (large rough vs. small finished castings) may be an important cause of this differential. (See Table VIII).

TABLE VIII

Per Cent which Labor and Material Cost are
of Total Value of Product, 1929-1931
(In per cent)

Item	North		South	
	1929	1931	1929	1931
Labor to Value of Product	44.2	45.6	29.0	32.9
Material Costs to Value of Product	27.4	30.6	35.4	35.2

Source: Bureau of the Census, Special Tabula-
tion for the Gray Iron Institute,
Incorporated.

Hourly and Weekly Wages

Data presented in Table VII show an increase in hourly wage rates from 49.1 cents in 1933 to 54.5 cents in 1934; average weekly wages increased from \$15.43 in 1933 to \$16.05 in 1934.

Earlier wage figures for the Gray Iron Foundry Industry are available only for four months during 1930 and 1931. (See Table IX). The extent of the sex differential is indicated by the fact that rates for women core-
matters (a skilled occupation) are less than for male common laborers.

TABLE IX

Wage Rates for Selected Occupations in
Gray Iron Foundries, 1930 and 1931
(Cents per hour)

Occupation	February 1930	August 1930	February 1931	October 1931
Molders:				
Bench	51.4	79.0	75.3	76.2
Floor	53.0	54.1	51.5	55.5
Loan	73.0	71.1	70.2	66.1
Machine	74.6	70.9	66.6	54.2

(Continued on next page)

TABLE IX (Cont'd)

Occupation	February 1930	August 1930	February 1931	October 1931
Coremakers:				
Men	73.7	71.4	70.8	69.2
Women	43.9	42.7	41.9	42.1
Patternmakers:				
Wood	82.9	84.7	76.4	75.2
Metal	72.9	76.7	72.6	69.0
Chippers	53.3	52.6	51.9	51.1
Common laborers	48.4	47.1	47.4	45.7

Source: Bureau of Labor Statistics, Monthly Labor Review, December, 1931, page 197.

Minimum wages paid to common labor in the first quarter of 1933 averaged approximately 20 cents per hour in the South and 30 cents in the North, as shown in Table X.

TABLE X

Minimum Hourly Wage Rates for Common Labor,
First Quarter, 1933

Region	Number of Plants	Number of Employees	Average Minimum Rate (cents)
United States	823	23,994	30.1
North	731	22,627	30.7
South	92	1,367	19.5

Source: Penton Publishing Company, Special Questionnaire. Averages computed by NRA, Research and Planning Division. See report of this Division by F. C. Reich, "Gray Iron Foundry Industry," (November 18, 1933), page 29.

Hours

Average weekly hours worked in the Industry showed a marked decline during the depression. While the number of hours per week exceeded 50 prior to 1930, average weekly hours, as shown above in Table VII, decreased to 30.9 in 1933, and rose to 32.9 in 1934.

Chapter III

MATERIALS AND MACHINERY

Machinery

Holding machines, sand blast machines, tumbling barrels and other foundry machinery used in all types of foundries are manufactured chiefly in the mid-western states. The total value of this machinery, according to the Bureau of the Census, declined nearly 82 per cent in 1933 from 1929. (See Table XI).

TABLE XI

Value of Selected Foundry Equipment
(In thousands)

	1929	1931	1933
Total	\$10,639	\$3,338	\$1,957
Holding Machines	3,752	948	1,051
Sand Blasting Machines	1,476	a/	a/
Other Types	5,411	2,390	906

Source: Census of Manufactures. "Machinery, not including transportation equipment."

a/ Included in "Other Types."

Materials

The principal materials used in the manufacture of gray iron castings are pig iron and scrap, which are obtained, respectively, from iron smelters and scrap dealers located in various states.

According to data contained in Table VIII, the cost of materials amounts to approximately 35 per cent of the value of the products manufactured in southern foundries, and 30 per cent in northern foundries.

Chapter IV

PRODUCTION AND DISTRIBUTION

Adequate information concerning the distribution of gray iron foundry products is not available, hence this chapter must be limited to data indicating production (manufacturers' sales), by states, and the value of exports.

Sales

Sales of gray iron castings presented in Table XII refer to castings sold as such by establishments classified by the Bureau of the Census in the "Foundry and Machine Shop Products" Industry and by those in all other industries which reported the sale of castings.

According to these data approximately 60 per cent of total 1931 manufacturers' sales were made by plants in Illinois, Michigan, New York, Ohio, and Pennsylvania.

TABLE XII

Manufacturers' Sales, by States
of Production, 1929 - 1931
(In thousands)

	1929		1931	
	Tonnage	Value	Tonnage	Value
U. S. Total	5,080	\$375,508	2,390	\$174,197
California	149	12,357	72	5,545
Illinois	504	36,073	312	13,396
Indiana	234	20,779	114	8,542
Massachusetts	132	14,173	84	7,966
Michigan	769	63,270	445	46,150
Missouri	123	8,741	53	3,200
New Jersey	156	15,321	99	8,039
New York	347	27,736	149	11,417
Ohio	739	59,502	240	18,132
Pennsylvania	824	41,779	377	18,539
Wisconsin	106	11,642	46	4,592
Total 11 States	4,083	311,273	1,891	145,820
38 Other States	997	64,255	499	28,377

Source: Census of Manufactures. "Foundry and Machine Shop Products." Establishments whose annual production is less than \$5,000 are excluded.

Exports

As indicated in Table XIII, gray iron castings are exported principally to Canada and Mexico. Of the total value exported in 1933, slightly more than 77 per cent was shipped to these countries.

Total 1934 exports, which increased over 1933, were 56 per cent less than 1938.

TABLE XIII

Value of Exports, 1936 - 1934
(In thousands)

Exports	1928	1931	1933	1934
Total	\$1,518	\$689	\$422	\$667
Canada	906	493	283	<u>a/</u>
Mexico	43	30	43	<u>a/</u>
Other Countries	569	176	96	<u>a/</u>

Source: Bureau of Foreign and Domestic Commerce, Foreign Commerce and Navigation of the United States.

a/ No information available.

